International Journal of Computer Science Engineering
and Information Technology Research (IJCSEITR)
ISSN(P): 2249-6831; ISSN(E): 2249-7943
Vol. 6, Issue 1, Feb 2016, 35-42
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DYNAMIC LOAD BALANCING IN DISTRIBUTED SYSTEMS BY AI AGENT

MOHAMMAD HAROON[1] & MOHAMMAD HUSAIN[2]

[1]Research Scholar (TMU) Moradabad, Uttar Pradesh, India

[2]Research Supervisor

Original Article

ABSTRACT

Artificial intelligent agent is used in distributed system for making the load information table and updating he dispatcher table for the assigning a client request, all the new coming job can be assigned by the scheduler, scheduler assigned the job to the computing machine, several computing machine are deployed in a network, all computing machine process execution responsibility, process creation and process execution both thing are performed at the computing machined, once the process is executed, the dispatcher can update the dispatched table and information table of the central coordinator is also updated, The artificial agent of the system span across all the machines of a cluster. Artificial agent have several responsibility, like it used to searched the available computing machine, it used to update the information table, and also update the dispatcher table, by the help of heuristic approach artificial intelligence can searched the under loaded system for load balancing, and the searching time have very significant role in a system performance, for improving the system performance, then the search time should be minimum, in system performance execution time, searching time, response time, etc are included. If the load balancing are not artificial intelligence based, then the performance of the is not optimal.

KEYWORDS: Dynamic Load Balancing, Artificial Agent, Information Table, Dispatcher Table

Received: Dec 26, 2015; **Accepted:** Dec 30, 2015; **Published:** Jan 07, 2016; **Paper Id.:** IJCSEITRFEB20165

INTRODUCTION

Dynamic load balancing is a method to allocate the load or assign the load to all computing node in a network at run time, once the processing is started, then at that time any computing nodes is over loaded, then by the method of dynamic load balancing, load can be migrated from over loaded machine to under loaded machine, entire distributed system logically behaves as a single computing system, but physically have several computing nodes or work stations. By the artificial intelligence agent load information of the individual computing is calculated and also by the artificial intelligence agent under loaded computing system is searched, and the load information[6,13].

A load balancing techniques are used to balance the load across the computing nodes, after that utilization of recourses is maximized, and also efficiency of the entire computing nodes are increase, objective of load balancing is to maximized the resource utilization, and maximized the through put of the entire network, and minimized the response time also minimized the execution time, in this paper a concept of AI agent are used, by the AI agent load of the work station can be migrated and load information table is also updated, in load information table load of entire computing nodes are stored, after the execution of the process and generation of the new process load information table is dynamically updated, on the basis of load information table data migration process are to be started. the proposed model consist server work station and client work station, the role of server work station is to maintain the information table, and also gives the different services to the client computing machine, a several computing nodes behaves as client computing node, on client machine process is generated at regular interval, and process is also calculated at server computing machine, one the new process is generated at any computing machine, immediately agent maintain the load information table, and when the any process is executed at any a computing machine the agent can update the information table immediately[7].

SYSTEM MODEL

In a proposed system client system is communicating with the server computer by the process dispatcher, the number of server are used in a entire distributed system, and every server can provide the services of the several client computing machine, for making of the system two different data types are used one is info data type, this data types are used to collect the load information, and another is IP, by the IP data types distributed system are organized

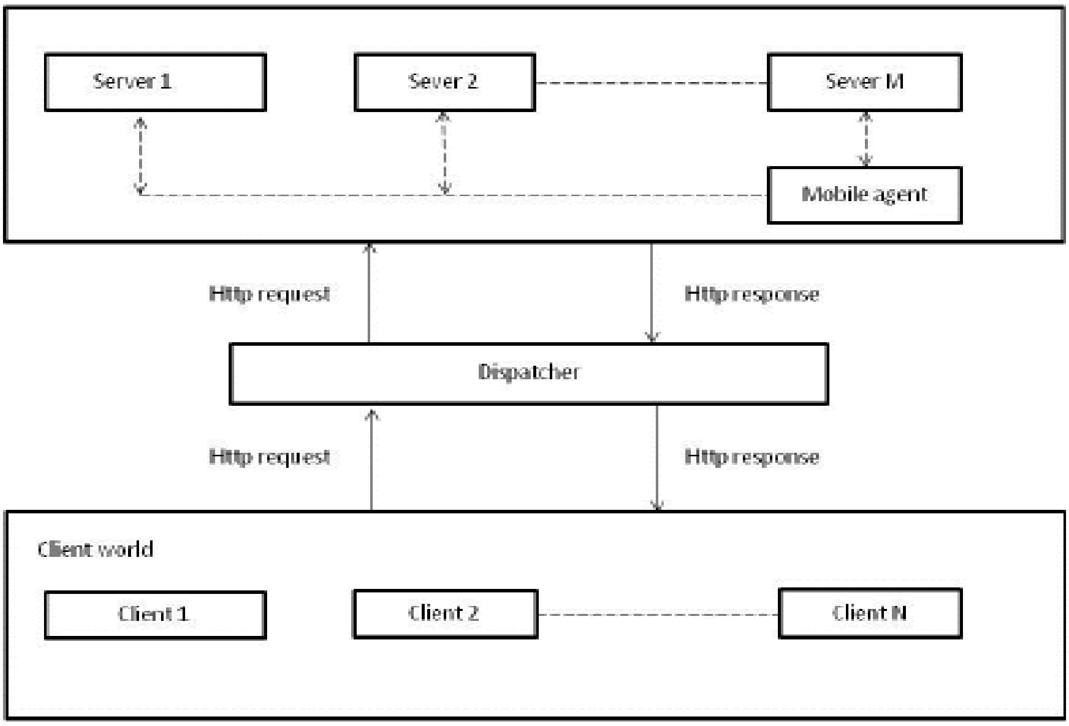

Figure 1: Dispatcher Based System Model

The dispatcher received the request from the client, then dispatcher send the load request to the server, request can be transferred by the to the server based on the IP address of the client request, the dispatcher can be managed by memory manage unit, that is known as MMU, MMU is managed by the operating system of the entire distributed system.

Information table of the server and dispatcher table of the server can depend to each other, once the client send a request to the server, but information table of that server is not allow to provide the services of the requested client in this situation dispatcher table can redirect that request to another available server, this load balancing is known as intra region load balancing, but if the request is full fill by the respective server than this load balancing is known as inter region load balancing, dispatcher table contain the IP address of the sever, IP address of the server are sorted in dispatcher table on the basis of load, lower loaded server IP is placed at beginning in a dispatcher table, and higher loaded server are the lastly enter in a dispatched table.

Table 1

Server	IP Address	Category
A	192.168.20.11	Lower loaded
B	192.168.20.254	medium loaded
C	192.168.20.12	Moderated loaded
D	192.168.10.20	High loaded

Assigning Request Identification Number

Dispatcher used the mod function to assigned the request number, given by the client machine, by the help of mod function assignment request number can be allotted, suppose n be the positive integer and m be any integer, such that m=q n + r, q and r any random number, in this equation q is quaint and r is the reminder, suppose n=5 and is varying in between 1, 2…20. Then the possible value of m mod n is 1,2,3,4,0,1,2,3,4,0…….

When any request arrive at dispatcher, dispatcher increment the count value by one, after that request number generated by dispatcher by the mod function, every request is associated with unique request number, on the basis of request number server machine gives the services of client machine, in case of request number used to allot the overloaded server machine, in particular situation dispatcher can switch the request umber and allot the request number to under loaded machine, this policy used to balance the server load, in cyclic way every server machine are used by the dispatcher.

Processing the Request

The request come from the client computing machine, and the request have assigned a request identification number by the dispatcher, request is received by the server, server machine compare the request with previous request, and compute the request as per the priority of request, dispatcher can send the request on the round robin fashioned, and the server machine used to compute or provide the service on first come first serve basis, if the server are busy the coming request are queue in sever queue, but dispatcher is also look the free server in a dispatcher table, on the basis of dispatcher table information, server can migrates the job from waiting queue to available server, this process is known as load balancing is outside of region[8].

Update of Dispatcher Table

Dispatcher used the round robin method to assigned the request to the server, but some time if server takes larger time to process the previous task in this situation new incoming jobs are transferred into waiting queue, to avoid this situation dispatcher takes the help from artificial agent, by the artificial agent dispatcher such the available server among total server machine and assigned the incoming jobs, this property is a dynamic property of job assignment, artificial agent can update the dispatcher table as well as information table of the server machine simultaneously, and search the available server machine periodically, this types of load assignment is a dynamic load assignment[9].

Response Time

- R = 2 (D+L+C) + (D+C/2) ((T-2)/ M)+ Dln ((T-2) / M+1) + max (8P(1+OHD) / B,
- DP/W) / (1-sqrt(L))
- B = Min line speed (bits per second)
- C = Cc + Cs

- Cc = Client processing time (seconds)
- Cs = Server processing time (seconds)
- D = Round trip delay (seconds)
- L = Packet loss (fraction)
- M = multiplexing factor
- OHD = Overhead (fraction)
- P = Payload (bytes)
- R = Response Time (seconds)
- T = Application turns (count)
- W = Window size (bytes)
- After the formulation of the above formula the response time
- Response time= (page size/minimum bandwidth) + round trip time + servers processing time + client processing time

Intelligent Agent

Intelligent agent is the software assistance for us, that can takes the specific task for us, for example if any one search the worldwide information from the web page, then a several pages are open, but if the search engine is agent based, then only few pages are open and that pages are matched our need. Now the intelligent agent can learn the user activity, and it can minimized the search space, and provide the search result in minimum time, intelligent agent reduced the complexity of the problem, suppose for load balancing, searching of under loaded system have a important task, by the traditional approach[3], or by the blind search approach, entire problem space can be analyzed, but by the intelligent agent only few portion of problem space can be analyzed, it can reduced the searched spaced, the main characteristic of intelligent is the self decision making, any situation for load balancing by intelligent agent, agent can take the decision how much portion of load is to be migrated from one computing machine to another computing machine, and on the basis of portion of load, agent simultaneously update the information table and dispatched table, all intelligent agent have the following characteristics.

- Reactive
- Goal directed
- Adaptability
- Socially capable
- Socially capable mean agent can communicate to another agent in processing of task, and taking of decision.

Performance Analysis

For making of network and collecting of information given pseudo code are used

The data structure for q item is organized for maintain the load information of the computing nodes[7,9]

```
STRUCT q item {
INT load information;
INT IP add [ ] = new INT [4];
};
Q item [ ] MMU queue = new q item [L];
```

The data structure for IP data is defined as

```
STRUCT IP data {
CHAR serve rid [ ] = new CHAR [L];
INT IP add [ ] = new INT [4];
INT rank;
};
IP data [ ] dispatcher_ table = new IP data [L];
```

For making of computing nodes given pseudo codes are used

```
STRUCT node
{
Float CPU speed;
INT RAM size;
FLOAT queue Len;
INT system no;
Float process size;
Process final process1;
};
// DISTRIBUTION OF THE PROCESSES
For (i=1;i<=no of computing nodes ; i++)
{
For (j=0;j<=cluster [i]; j++)
{
if (system[i][j].system no== cluster head. system no)
```

```
GOTO next;
System[i][j].process size=0;
Counter=0;
Overloaded system =system[i][j];
For (k=0; k<(c=rand () %20); k++)
{
If (system[i][j].process size>system[i][j].queue Len)
Break;
b=rand () %20;
Counter++;
```

Mobile agent make the significant role in load balancing, our algorithms are code in C languages are the performance of the agent based load balancing are make a significant role

The system throughput is measured by gradually increasing the number of user requests

CONCLUSIONS

By the using of artificial intelligent agent in dynamic load balancing, performance of the load balancing system is improved, and response time, execution time of the distributed system are drastically decreases, by the using of artificial agent in dynamic load balancing, agent continuously update the information table, and dispatcher table, and agent used to search the under loaded system in entire network, by the using of agent approach length of waiting queue of the entire computing system are decrease, and in traditional system job request is assigned on the basis of modulus rule, but in case modulus rule, some server is engaged to calculate the older job, during that new job are assigned, and that signify the increasing of queue length, but by the help of artificial agent all in coming request is assigned on available server[11].

The artificial agent communicates only when the request assignment condition is fail. The communication is not at all regulated. The load information of all the computing system is proactively collected ranked and dispatcher table updated regularly.

REFERENCES

1. *"Said Fathy El-Zoghdy. A Load balancing Policy for Heterogeneous Computational Grids Vol. 2, No. 5, 2011"*
2. *"S. Xian-He, W. Ming, GHS: A performance system of Grid computing, in: Proceedings of the 19th IEEE International Symposium on Parallel and Distributed Processing, 4–8 April 2003".*
3. *"X. Tang and S. T. Chanson. Optimizing static job scheduling in a network of heterogeneous computers. In Proc. of the Intl. Conf. on Parallel Processing, pages 373–382, August 2000".*
4. *"Mohd Kalamuddin Ahmad, Mohd Husain, Required Delay of Packet Transfer Model For Embedded Interconnection Network, International Journal of Engineering Research, vol 2, issue 1, jan 2013".*
5. *"Kalamuddin Ahmad, A. A. Zilli Mohd. Mohd. Husain, A Statistical Analysis And Comparative Study of Embedded*

Hypercube", International Journal of Computer Applications, Volume 103, Oct 2014"

6. *"Mohammad Haroon, Mohammad Husain, Analysis of a Dynamic Load Balancing in Multiprocessor System, International Journal of Computer Science engineering and Information Technology Research, Volume 3, March 201"3*
7. *"Mohammad Haroon, Mohammad Husain, Different Scheduling Policy For Dynamic Load Balancing in Distributed System, 3rd international conference TMU Moradabad",*
8. *"Mohammad Haroon, Mohammad Husain, Different Types of Systems Model For Dynamic Load Balancing, IJERT, Volume 2, Issue 3, 2013".*
9. *"Mohammad Haroon, Mohammad Husain, Different Policies For Dynamic Load Balancing, International Journal of Engineering Research And Technology, Volume 1, issue 10, 2012"*
10. *"Mohd Haroon Ashwani Singh, Mohd Arif, Routing Misbehabiour In Mobile Ad Hoc Network, IJEMR, Volume 4, Issue 5, October 2014"*
11. *"Abdul Muttalib Khan, Mohd. Haroon Khan, Dr. Shish Ahmad, Security In Cloud By Diffie Hellman Protocol, International Journal Of Engineering And Innovative Technology(IJEIT), Volume 4, Issue 5, November 2014"*
12. *"AM Khan, Mohd Haroon, S Ahmad Security in Cloud by Diffie Hellman Protocol international Journal of Engineering and Innovative Technology (IJEIT) Volume 4, Issue 5, November2014".*
13. *"Afsaruddin mohd haroon, riyazuddine, mohd shahid, Adjacent Selection Method for Load Balancing in Distributed Network by Artificial Intelligence International Journal Of Advanced Research In Electrical, Electronics And Instrumentation Engineering, 2015/8/20"*
14. *"M Haroon, M Husain, Interest Attentive Dynamic Load Balancing in Distributed Systems, IEEE xplore."*
15. *"S Srivastava, M Haroon, A Bajaj, Web document information extraction using class attribute approach, IEEE xplore".*